r, begin at 7.7 mm until intermediate vision zone 172 begins where the apical radius varies regularly and continuously within zone 172 until near vision zone 168 is encountered with a r value of 7.4 mm. The apical radius of curvature remains constant within zone 168 until intermediate vision zone 171 begins. The r value increases continuously and regularly within zone 171 until distance vision zone 162 begins at which point the r value becomes 7.7 mm as in distance vision zone 164. The lens surface 160 is symmetrical about bisecting plane 166 and thus the variation in apical radius is similar in the remaining angular zones of surface 160.

In accordance with the embodiments of the invention as described, a computer program may be utilized to calculate the required polynomial values for a large number of semi-meridian sections of an intraocular lens or contact lens. Thus, a lens surface configuration in accordance with the invention may be computer modeled providing the ability to map or generate the surface on a computer numerical control profiling milling or grinding machine. It should be apparent that by designing the semi-meridian sections within both the distance vision and near vision zones individually as having identical and constant curvature and power, the generation of the lens surface might be simplified, but more importantly by defining each of the semi-meridian sections singly, a great amount of flexibility is possible in the lens design while achieving the desired optical characteristics.

Based upon the foregoing, a lens configuration of the invention may be utilized to form an intraocular lens of either the posterior or anterior chamber type, or a contact lens, which have one or more areas potentially optically corrected and contributing to distance vision, near vision or a range of intermediate vision accordingly. The surface generated in accordance with the invention may be applied either to the anterior or posterior surface or to both the anterior and posterior surfaces of an intraocular lens or contact lens. The radii defining the semi-meridian sections in the intraocular lens of this invention may range from infinity, describing a flat surface, to 4 mm such that the clear central vision of the patient is optimized. For example, either surface of an intraocular lens in accordance with the invention may comprise the novel surface including a plurality of the angular zones contributing to distance vision, near vision or a range of intermediate vision while the other surface of the lens is planar, convex spherical or aspherical, or concave spherical or aspherical. Similarly, both the anterior and posterior surfaces of an intraocular lens may comprise the generated surface in accordance with the invention which act together to contribute to the desired clear central vision over the described full range of distances. An intraocular lens in accordance with the invention may be made in a diameter and thickness consistent with conventional intraocular lens design, and when utilizing aspheric semi-meridian sections, may have instantaneous eccentricity values ranging from 0 to 4.0.

A contact lens configuration incorporating the invention may be generated using radii defining the semi-meridian sections of one or both surfaces of the lens which range from 4 mm to 30 mm, and selected such that the clear central vision of the patient is optimized. The anterior surface of the contact lens may be generated in accordance with the invention, and the posterior surface of the contact lens may be shaped to conform to the corneal surface of the eye and may comprise a sur-

face in accordance with the invention. A contact lens may be generated to a center thickness and diameter consistent with conventional contact lens design while incorporating the novel surface of the invention as one or both surfaces thereof, and when utilizing aspheric semi-meridian sections, may have instantaneous eccentricity values ranging from 0 to 4.0. In both intraocular lens or contact lens design, the polynomial values for the coefficients A, B and C may range from -10.0 to 10.0 and values for exponents F, G and H may range from 0 to 10.0.

It will be evident to those skilled in the art that the invention is not limited to the details of the foregoing illustrative embodiments, and that the invention may be embodied in other specific forms without departing from the spirit thereof. It will thus be seen that the objects and advantages of the lens configuration in accordance with the invention may be achieved by modifying the embodiments described herein, and such modifications would be obvious to those of ordinary skill. It therefore is understood that the scope of the invention is only limited by the appended claims of the invention.

What is claimed is:

1. A multifocal lens configuration providing correction of the refractive error and accommodative insufficiency of the eye, comprising;

a lens body having first and second surfaces, wherein at least one of said surfaces is defined as being a rotationally non-symmetrical aspheric surface, said aspheric surface varying in curvature and refractive power rotationally about the apical umbilical point of the lens surface at which the derivative of curvature vanishes, with the surface contour defined by a continuum of mathematically defined semi-meridian sections tangent to one another at said apical umbilical point and which together form a continuous surface that includes at least four defined angular zones of predetermined curvature, wherein the semi-meridian sections in each of said at least four defined angular zones are varied in a predetermined manner to provide clear vision over ranges of near, intermediate, or distance vision.

2. A multifocal lens configuration as in claim 1, wherein,

said at least one of said surfaces includes a plurality of angular zones providing at least one defined distance vision zone, at least two defined intermediate vision zones, and at least one defined near vision zone wherein the apical radius of said semi-meridian sections defining the surface curvature determine the required refractive properties for clear central vision at each of said corresponding distance ranges.

3. A multifocal lens configuration as in claim 2, wherein,

said apical radii of said semi-meridian sections in said at least one distance vision zone are constant and said apical radii of said semi-meridian sections in said at least one near vision zone are constant.

4. A multifocal lens configuration as in claim 2, wherein,

said apical radii of said semi-meridian sections in said at least one distance vision zone vary continuously and progressively and said apical radii of said semi-meridian sections in said at least one near vision zone vary continuously and progressively.

5. A multifocal configuration as in claim 2, wherein, at least two of said intermediate vision zones are pro-